SHORT RESUME/ SYNOPSIS OF Ph. D TOPIC
Entitled

Swami Ramanand Teerth Marathwada University, Nanded, Maharashtra, India

(UGC recognized, NAAC Re-accredited 'A' grade state university)

"STUDIES ON STATUS OF FRESHWATER TORTOISE FROM LATUR DISTRICT (M.S.) INDIA"

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-: SHORT RESUME/ SYNOPSIS OF Ph.D TOPIC:-

"STUDIES ON STATUS OF FRESHWATER TORTOISE FROM LATUR DISTRICT (M.S.) INDIA"

➢ ABSTRACT OF PROPOSED WORK PLAN/ PROBLEM

Tortoise is creeping organism found in the order Chelonia or Testudines and family testudinidae of Class Reptilia. Turtles are characterized by a special bony or cartilaginous shell developed from their ribs which acts as a shield. Tortoise is the only reptiles that have a shell and no teeth and are found in both temperate and tropical climates. Tortoise occurs in different kinds of habitat, marine, freshwater and land. [**S. Ramakrishna and et al.**]

The present study will be related to identification, morphology, habit and habitat, sexual dimorphism, nesting behavior and threatened condition etc. of tortoise from Latur district in Marathwada region from year June 2021 upto 2024.

Latur Municipal Corporation (LMC) is the local civil body. It has a historical background. This city has geographical actual Google coordinates i.e. latitude about 18024'28.6452" N and longitude 76034'36.3612" E located in Maharashtra state at country India.

In present situation some species of tortoise becomes endangered, vulnerable and threatened.
We observe this real environmental problem and now need to their conservation in present situation.

Keywords: Tortoise, Endangered, Vulnerable, Threatened animal, Latur district, etc

I. INTRODUCTION

The origin/reference of tortoise was found in Vedic literature such as, "**Yajur Veda**". Having its Sanskrit name is "**Kurma**" i.e.tortoise. Kurma is an Avatar of the Hindu God Vishnu. Tortoise animal have cultural and religious value. In Hindu, mythology has one story behind origin of tortoise (Kurma) is most commonly associated in post-Vedic literature such as the "Puranas" with the legend of the churning of the Ocean of Milk, referred to as the "**Samudra Manthan**". The world-tortoise supporting the Earth, Kurma (Tortoise) is listed as the second "**Dashavatara**", which are the ten principal incarnations of Vishnu dev.**[https://www.google.com]**

After that, in the 19th century, an English natural scientist, geologist and biologist named **'Charles Darwin'** is best known for his contribution to evolutionary biology. Darwin also observed giant tortoises on the Galapagos Island. These tortoises were so large that two people could ride on them. Darwin noticed that different tortoise species lived on island with different environments. He realized that the tortoises had traits that allowed them to live in their particular environment. For example, tortoises ate plants near the ground had rounded shells and shorter neck. **[www.ck12.org, 1. Chapter theory of evolution]**

'Herpetology is the branch of zoology which deals with the study of amphibians and reptiles which provides significant insight of terrestrial and aquatic ecosystem'.

Tortoise is a terrestrial belongs to subphylum vertebrate animal but it also shown in aquatic region. Animal Tortoise is belonging to **Class- Reptilia**. These are the first true terrestrial animal. They show characteristic features such as, creeping and crawling animals. Reptiles are the class of cold-blooded (Poikilotherms) vertebrate animal'smeans; their body temperature may vary with their environment. It does not maintain their body temperature constant. Class Reptilia includes animal examples like tortoise,snakes, crocodiles, lizard, etc. Few may be aquatic or semi aquatic and some animal also found in marshy area. Locomotion and movement is done by the limbs. The limbs are pentadactyl in number and have digits bear claws. Skin of these animals is dry, non-glandular and covered by exoskeleton of epidermal scales or scutes, shields or plates. Internal ear is present which is called as tympanum.

In circulatory system, heart has two complete auricles, but ventricles are incompletely partitioned. So heart is not perfectly four chambered then we called heart is three and half chambered. In these animals brain is well developed with olfactory lobes and cerebellum. These animals shows prominent sexual dimorphism i.e. sexes are separate. Fertilization is internal type. They are oviparous, animals show parental care**.[Modern text book of Zoology (vertebrates) R.L.Kotpal]**

- **External Morphology:**

Tortoise has their morphological characteristics as like, the names 'turtle', 'tortoises'and 'terrapins' are interchangeably used, which consist 244 species in Triassic era. Where, the term turtle is applied to aquatic or semiaquatic form with flattened circular shells and tortoise to land fom whereas terrapin is reserved for edible purpose. Tortoise is described as a chelonian lives on land; feet are hard, scaly and strong for crawling. Tortoise has claws to dig burrows and body covered with hard, rounded dome shaped shells (dorsal carapace and ventral plastron) and also possesses head,feet, tail and limbs. Teeth are absent replaced by horny beak- like structure. Although breath by lungs and all tortoises are oviparous, eggs are spherical with calcareous shells.Generally, the female tortoise made their nests in moist sandy soil by digging with their sharp claws and neck. They selected the riverbanks (20-25m higher than the water line) for their nesting sites. It is feed both on plants and animals. It shows sexual dimorphism. Life span of tortoise is up to 150 years old etc. **[Modern text book of Zoology (vertebrates) R.L.Kotpal]**

- **Habit and Habitat:**

Tortoise is living habitat like rivers, burrows, land, rocks, pond, and stagnant water bodies etc. Habitat destruction associated with human population increase and several human activities may very well be a factor. The status of freshwater turtle species has decreased, due to hunting, habitat destruction, fragmentation, agricultural and several anthropogenic actions. Due to habitat destruction, eutrophication, use of chemical fertilizers, over grazing of aquatic vegetation and paucity of water, the population of *Geoclemyshamiltonii*(Spotted Pond Turtle) has decreased. **[M Zaheer Khan1, *Amtyaz Safi1, and et.al (2015)]**

- **Life cycle:**

Life cycle of tortoise shows four main stages i.e. adult tortoise gets fertilized, egg laying by female, hatchlings, juvenile and mature into adult. After fertilization, the female tortoise lays her eggs in a nest by making burrows. The female tortoise able to lays 4-8 egg. She digs a hole near to reservoir or suitable place and covers eggs with sand (nesting). The time for the eggs to hatch varies, depending on the species. After six weeks to around two months, hatchlings emerge from the eggs. The baby tortoise has an egg tooth or caruncle which they use to break the egg shell, come out of the eggs and enter the water.

After six weeks to two months of time. The baby tortoise have hatched, they are completely independent and do not require parental supervision. During this period, they feed on tiny organisms found. Till they reach the adult stage. After hatching, depending upon the type of species, they are sexually mature and reach adulthood. During this stage, the adult tortoise get shift from their current location to the mating ground. Only female tortoise laid eggs. Male tortoise migrates wherever they mate and feed. The female adult tortoise has the ability to store the sperms in the oviduct during ovulation. The female tortoise returns to search suitable location for lay eggs and then the entire life cycle begins again.

- **No. of species:**

Twenty nine species of tortoises and freshwater turtles occur in India. Northeastern India has the largest species diversity with 21 species. **[Ahmed and Das, 2009]**

Globally, turtles are among the endangered of the major groups of vertebrates, surpassing birds, mammals, cartilaginous and bony fishes, and amphibians. According to the current IUCN 2013 Red List, 135 turtle species are officially regarded as globally threatened [(Critically Endangered (CR), Endangered (EN), or Vulnerable (VU)]. Of the 335 total species of turtles and tortoises, 107 (31.9%) are CR or EN, 167 (49.9%) are Threatened (CR, EN, or VU), and 175 (52.2%) are threatened or extinct [**M Zaheer Khan1, *Amtyaz Safi1, and et.al (2015), andVan Dijk *et al*.,(2014)]**

The Indian flap shell tortoise is one of the 22 species of tortoise found in India. Three subspecies of the Indian flap shell turtle, *Lissemys punctate*, are currently recognized: *L.p. punctata, L. p. vittata, and L. p. andersonii****[*****Anweshan Patra. (2020) and Bhupathy*et al.* 2014]**

- **Banned species of tortoise**: Red eared slider turtle, Indian star tortoise banned in India. [Mumbai News]
- **Sexual dimorphism:**

Tortoise males are usually smaller than females; Water turtles are dimorphic which is why the females will be significantly larger than the males.

In male tortoise the nails are quite long which are also used to tickle the necks of the females when they are courting.

In male tortoise with nails, the tail are also going to be longer than females. Ventral (cloaca) will be located near the tip of the tail.

Females are considerable larger once they have reached maturity with size larger than 6 inches.

Female front claws will also be much shorter in comparison to the male claws.

Female tail will be much shorter and the cloaca will be much closer to the base rather than towards the end of the tail.

In female at the plastron side the gular scutes/gular projectionis smaller than the males.

At the bottom of tortoise shells surface is concave (meaning it goes inward) in male. But in female this surface is convex.

In male openings (anal scutes) will be much larger and wider in comparison to female smaller egg shaped openings.

The male tortoise tail is longer as compare to female tail. **[https://www.allturtles.com/turtle-identification/]**

- **Induced breeding:**

Animal breeding means the process of selective mating of animals with desirable genetic traits, to maintain or enhance these traits in future generation. This involves estimation of the genetic value of individual for trait including growth rate and yield of product. Breeding in hatchery condition could be an appropriate solution to replenish the natural population of tortoise **[Hossain et al., 2005].** The artificial breeding in the hatchery could be an appropriate solution to sustain the population as well as to cater the market demands. [**Md. Lokman Hossain et al. 2010]**

- **Population:**

A population has been defined as a group of organisms of the same species that inhabits a certain place and has certain characteristics that the individuals do not, such as: density, birth rate, etc. **(Odum 1972).** The size of a population can be determined by two main techniques: census or sampling. A census is a total enumeration of all the individuals in the population and is usually not feasible or, if feasible, is often prohibitively expensive for most wildlife populations. Therefore, statistical sampling methods must be used in most cases. The goal of a population estimate is to determine the number of individuals, or estimate the total population in an area. **[ARTUR ANDRIOLO, FERNANDO PACHECO RODRIGUES, et al. (2010)]**

- **Acts and Laws:**

For to protect and conservation of animals and their species from any type of harm some acts and laws are given by the Government. According to The Wildlife Protection Act, 1972 of India, this species is under Schedule-I; removal from the wild, harming or killing this species is a punishable offence. No tortoise is observed in captivity and gut content analysis and gonadal development analysis via dissections are prohibited. All research will conduct by visual observations insitu. **[Anweshan Patra. (2020)].**

- **Importance:**

Tortoise is consumed by some people as a source of protein and as a delicacy [**Anweshan Patra. (2020) and Rao, 1986]** Still now, in many markets of India, tortoise is covertly sold as food.

Tortoise is the keystone component of freshwater ecosystem. Their vital roles include control of insect and snail population, vegetation management, seed dispersal and Scavenging activities. [**Safi and Khan, 2014]**

Tortoise is heavily exploited for medicine and food in Asia and China. Soft shell turtles are hunted for food due to palatability of its meat. **[Jatkins, 1995; Motluk, 1995]**
Tortoise is also used as ornamental purpose in household area.

Tortoise species are indispensable for the sustenance of different ecosystems, in as much as, it works as a scavenger in different ecosystem, aquatic and terrestrial habitat in particular; thereby keep the water quality pollution free. **[Sarker and Hossain, 1995]**

- **Threatened condition:**

Tortoise populations are globally threatened; about 47 % species are classified as Vulnerable, Endangered and Critically Endangered **[IUCN, 2010; Van Dijk et al.2014]**.
Tortoise are facing many anthropogenic threats such as degraded habitat, excessive hunting and closure of canals, unavailability of proper nesting sites, illegal export and pollution **[Wahab *et al*., 2012].** Lack of knowledge about freshwater tortoise has affected their conservation and several species are declining. Current study will give an effort to bridge the information gap and provide a baseline data for further scientific exploration for biodiversity management perspective in order to keep our ecosystem intact.

- **Economic Importance:**

This study can enhance the economic importance of tortoise like by increasing production, rearing and culturing etc. of these species. As like fishes, we also increase their market value.

- **Study Site:**

Latur is a city in Maharashtra state, India, and is one of the largest cities of the Marathwada region. Latur has an earlier Municipal Council, which was established in 1952. Today, Latur district consist 10 taluka namely, Latur, Ausa, Nilanga, Udgir, Ahmedpur, Jalkot, Chakur, Shirur- Anantpal, Devni, and Renapur classified under five subdivisions with 948 villages.**[https://www.google.com]**

Turtles and tortoises are common sightings in parables, stories, and pop culture and we celebrate World Turtle Day on **May 23** to honor these resilient animals.The purpose of World Turtle Day, May 23, sponsored yearly since 2000 by American Tortoise Rescue, is to bring attention, increase knowledge and respect for turtles and tortoises and encourage human action to help them survive and thrive**. [https://www.google.com/]**

Due to climate change affecting nesting of olive ridley turtles. [**The Indian Express News**]

The tortoise is threatened by illegal trade, with hotspots and international trafficking to people purchasing the species to keep as pets, illegally; it is the lack of information among consumers as well as officials that is driving the fate of these creatures.[**http://www.specieson the brink.org**]

II. REVIEW OF LITERATURE AND DEVELOPMENT IN THE SUBJECT: (Previous work done in the relevant area)

Review of literature means gaps you identified in your given topic. It tells about existing study and 'state of the art' research in your concerned area. It helps to evaluate the literature relating to content of the work you have to decide. Below is the content of literature review of present topic:

International level:

Ayaz, D. and Budak, A.(2008). This study discussed on the distribution and morphology of *Mauremys rivulata* (Valenciennes, 1833) (Reptilia: Testudines: Geoemydidae) in the Lake District and Mediterranean region of Turkey.

Berry, J. F. and Shine, R.(1980). This study based on the Sexual size dimorphism and sexual selection in turtles (Order Testudines).*Oecologia*

CAUGHLEY, G. 1977. This work was based on Analysis of vertebrate population. Wiley& Sons, London, U.K

Hossain, M.L., Sarker, S.U., Sarker, N.J. (2012). The Study is focused on food habits and feeding behaviour of Spotted Flapshell turtle, *Lissemys punctata* (Lacepede [sic], 1788) in Bangladesh.

National level:

Jadhav, T. D., Sawant, N. S. and **Shyama, S. K. (2018).**This work is based on the Diversity and distribution of freshwater turtles (Reptilia: Testudines) in Goa, India.

Jadhav, T., Sawant, N. S. and **Shyama, S. K. (2018)**. First report on presence and status of introduced invasive species

S. Ramakrishna[1], M. Jayashankar[2], R. Alexander[1]* and K. Avinash[3] (2014). This work was based on collection of the available literature resources related to Testudines of India. Different aspects of diversity studies pertaining to turtles in India are presented in this review along with threats and conservation initiatives in different parts of India in different timeline. Testudines of India: A Review on Diversity, Threats and Conservation Initiatives.

Smith M.A., (1933). This study based on the fauna of British India, including Ceylon and Burma Reptilia and Amphibia. Vol.1 Loricata, Testudines. Today and tomorrow's Printers and publishers, New Delhi.

Pandit R.K. (1997). This study is based on distribution pattern of turtles in the Ganga River between Rishikesh and Kanpur. Ph.D. thesis in Zoology, Jiwaji University, Gwalior, M.P

Pawar, S.S. and Choudhury, B.C. (2000). The work is based on the content of aninventory of chelonians from Mizoram, North-east India: New Records and some observations on threats. Hamadrayad, Centre for Herpetology, Madras.

State level:

Andhare, V.V. and P. Hatkar.(2015). This study is based on Asurvey of sea turtle nesting beaches and their occurrence in the off shore waters off the coast of Sindhudurg district, Maharashtra.

Daniel J.C., (1983). The book of Indian reptiles.Bombay Natural History Society, Bombay

Giri, V. and N. Chaturvedi (2006). Sea turtles of Maharashtra and Goa. In Marine Turtles of the Indian subcontinent, eds. K. Shankar and B.C. Choudhury

Giri, V. (2001). The work is done on the topic of Survey of marine turtles along the coast of Maharashtra and Goa. A GOI-UNDP sea turtle project report. Bombay Natural History Society, Mumbai.

Kakodkar, A. (2006). The studies on Perceptions of local stakeholders about marine turtles on the Sindhudurg coast of southern Maharashtra, India.

Sea turtle conservation and its success story **(2017).** Report by the Divisional Forest Officer, Chiplun Office.

Sundaram, S. and S. Mane. (2013). the studies were occurs on the *Green turtle, Chelonia mydas stranded at Malvan, Maharashtra*. Marine Fisheries Information Service;

Vishwas Katdare and Ram Mone. (2005). The study was occurs on the concept ofSecond successive year of the Marine Turtle Conservation Project in Konkan, Maharashtra, of the five species of marine turtles occurring onthe Indian coast, the olive ridley *Lepidochelysolivacea* is the most common on the Maharashtra coast. The present note is based on the currentyear's marine turtle conservation activities. Indian Ocean Turtle Newsletter No. 2Sahyadri Nisarga Mitra, Chiplun, District Ratnagiri, Maharashtra 415605. India

Walmiki Nitin 1-3, Vijay Awsare1, et al. (2012). They worked on the Herpetofauna, Mangroves, Reptiles and Amphibians of Maharashtra Nature Park, Mumbai, Maharashtra (India).

District/Region: No record

The tortoise/turtle study is neglected/ no one record was not found from this Latur district region (Marathwada) hence, the present work is selected.

III. OBJECTIVES OF RESEARCH / PROPOSED HYPOTHESIS:

The entire theoretical perspective of the study is determined by the objectives. Entire thesis is a way addresses the internal dynamics of the objectives. Objectives determine the scope and the limitations of the research. It helps in knowing what to do and what to avoid. Following are the objectives of given research topic as like:

1. To identify (Morphology) freshwater species of Tortoise in Latur district region/ in given study area.
2. To determine the diversity and distribution of freshwater Tortoise in Latur district region.
3. To study the Habitat, food and feeding behaviors.
4. To study the population counting.
5. To study the Sexual dimorphism in freshwater Tortoise.
6. To study the Nesting behaviors.
7. Attempt to study the Induced Breeding.(if it is possible or ethical)
8. To identify threats/threatened condition.

- **Hypothesis of Study:**

The tortoise species are in threatened condition, vulnerable and endangered. They need to conservation.

IV. METHODOLOGY:

Several survey techniques were adapted for observation and census (official count) of turtles. During field visit in study area in each province, the population of each species of turtle will recorded. By using published literature species will identify in the field.**(Smith 1931, 1943, Ahmed, Das and Dutta (2009), Neelimkumar Khaire (2008), Whitaker (2009),Ernst *et al*. (2000) and Khan (2013)**after confirming specimen was released back at same place / location.

- **Study Area:**

Freshwater water bodies like river, pond and other relevant land area, muddy area, burrows and house hold pet animal condition of specially Latur district region and villages near districts of Marathwada region (Maharashtra State), India.

- **Topography:**

Latur district is in the Marathwada region in Maharashtra in India, located between 17°52' North to 18°50' North and 76°18' East to 79°12' East in the Deccan plateau. The district is partly in upper Godavari basin. District is situated at the plateau of Balaghat and lies in the Manjara River valley. Manjara is the main river which flows on the Balaghat plateau along with its tributaries: Terna, Tawarja and Gharni. The other three tributaries of Manjara are Manyad, Teru and Lendi which flow on the northern plains. Rain water is drained by the Manjra River and its tributaries like Terna, Tawarja and Gharni and their sub tributaries like Rena, Devni, Manar, Tiru, Karanja, and Lendi. The following are the important rivers draining across the district.

In general, the climate of the District is dry throughout the year except during the southwest monsoon season. There are four seasons in a year. The rainy season (southwest monsoon season) starts in the beginning of June and last up to the end of September. It is followed by the post monsoon season from October to mid-November. The winter season is from about the middle of November to the end of February and the hot dry season from March to May.

May is generally the hottest month with temperature at 40°C and means daily minimum temperature 27 °C. In summer the humidity is less than 25%. The normal annual rainfall over the district varies from 650 to 800mm and it increases from southwest to northeast. It is minimum in

the southern part of the district around Nilanga and increases towards north east and reaches a maximum around Udgir. The region receives 84 percent rainfall during the period of monsoon season. Remaining 16 percent rainfall receives in the rest of period. **[DISTRICT SURVEY REPORT FOR LATUR DISTRIC https://cdn.s3waas.gov.in]**Apart from river Latur district consist of reservoir e.g. (Banshelki, Pimpri), pond, lakes, irrigated areas, well, temple water etc.

A. DIRECT COUNTING:

1. Habitat Searching /Transact Method

At each site several hours search will be carried out to observe as many turtles as possible with in a circular central zone along the wetlands, such as lakes, ponds, marshes, water reservoirs, canals and rivers, etc. These findings consist of approximately within a 250 meter radius of sampling points. At first, the suitable place with suitable habitat was chosen. Nearly 1 sq. km. area will select for the study to observe the surface of habitat. The turtles active both in the day as well as at night, some of turtles will found sitting on partly submerged logs, larger stones and even on mudflats by the side of water, while some where seen moving or resting just near their shelters and they became alert to see the observers and some of them ran away very fast and dived into the water or lost in the mud underwater. Species will count and identifies in the field. In this way, several km of study areas will survey and finally the population of different species of turtle will estimate per square km. Their exact locations and home ranges will be record by GPS, so that where any observer and biologist or naturalist, comes for study they can easily locate the place where the recorded or reported species are found. Similarly night survey will be doing with the help of search lights and torches.

2. Capture through Nets

Some species of small turtles will capture by using nets, such as cast net. It was done in small area and in this way; most of the lakes will survey.

3. Boat Surveys

Surveys of freshwater turtles in river, large lakes and water reservoirs will made by using fishing boats and making observations while travelling from one end to the other and the same route was followed on the return trip. In this way, 6 km around trip will cover. As soon as the species will sight, the time, locations and habitat types will be record.

4. Incidental Sightings

Incidental sighting is also helpful to determine the presence and population status of the species. In this way number of species, date, time, location and habitat type will record.

5. Basking Behavior

In winter, the temperature of the water becomes very low. Due to cooler weather and cold water, this cold blooded reptile avoids living in water and so they come outside the lake to enjoy sunshine to keep them warm. Thus, counting of the turtle species becomes very easy at particular area during this season.

6. Use camera, recording the videos at collection site.

B. INDIRECT COUNTING METHODS

1. Information from different sources

Information will collects from the staff of Wildlife Department, local fishermen, boatmen, and field staff of Irrigation Department and other members of local community of different villages.

2. Presence of Signs like fecal pellets, tracks, den or tunnels (egg laying excretion)

Evidences from the impressions of fingers or foot prints, or tail, presence of fecal pellets, tracks and existence of tunnels (egg laying excretion) are helpful for finding the existence, range and rough population of the species. The study is based mainly on direct observation; enumerations depended on basking and floating turtles.

- **Instruments:**

1.Measurement tape

2. Vernier Caliper

3. GPS tagging images

4. Videos

5. Net i.e. cast net

6. Hooks

7. Rope etc

Method of research: Survey oriented work. The conducted survey will do with the help of visual encounter method and Sampling method.

Method of data collection:

- ✓ Journals
- ✓ Published research papers
- ✓ Published thesis
- ✓ Internet information
- ✓ Field Visits
- ✓ Questionnaire method
- ✓ Personal interview method
- ✓ Census method
- ✓ Observation study
- ✓ People experience study

Statistical Data analysis:

Data gathered from field observations will analyze statistically using F-test (One way ANOVA) in order to find variation among population density. MS Excel will used to compute tabular data. If requires ANOVA and Coefficient correlation method will also be used.

Morphological study as body parts viz., Carapace length and breadth, Plastron length, weight of the specimen etc. will be do and standard deviation will calculated by using MS excel.

V. IMPORTANCE OF STUDY /SOCIETY APPLICATION :

International Status

Study of freshwatertortoise is the area of given research and many groups of scientists were worked in this area of the research. Few of the research groups working at international level are listed below:

Akbar, M., Mushtaq-ul-Hussan, M. and Zaib-u-Nisa (2006). Distribution of freshwater Turtles in Punjab. Pakistan.

Auffenberg, W. and Khan, NA.(1991). Studies of Pakistan Reptiles. Notes on *Kachuga smithi*.Hamadryad.

Azam, MM., Fakhri, MS. and Saifullah. (2005). Some Observation on the distribution and abundance of freshwater turtles in the River of Indus. Rec. Zool. Surv. Pakistan.

Azam, MM. and Saeed, K. (2011). Abundance and distribution of freshwater turtles at Guddo and Taunsa barrages and Head Punjnad, Rec. Zool. Surv. Pakistan.

Anjum Ara1, Usman Ali1, Muhammad Furqan2*, etal. (2021). Diversity, Distribution and Threats to Freshwater Turtles in Mirpur, Azad Jammu and Kashmir, Pakistan **,**1Department of Zoology, Mirpur University of Science and Technology, Mirpur, AJ and K 2Department of Zoology, University of the Punjab, Quaid-i-Azam Campus, Lahore. Pakistan zoological journal

Das I., (1995). Turtles and Tortoises of India. Oxford University Press

Ernst, C.H. and Barbour, R.W. (1989). Turtles of the World. Smithsonian Institute Press, Washington, USA.

Jatkins, M.D., (1995). Tortoises and freshwater turtles: The trade in Southeast Asia. Traffic International, U.K

Motluk.A. (1995). Study of hunting and trade of freshwater turtles and tortoises (Order Chelonia) at DanauSentarum, Walter. Olivia.

Moskovits, D. K. (1985). The behavior and ecology of two Amazonian tortoises, *Geochelone carbonaria* and *Geochelone denticulata,* in the northwestern Brazil.Ph.D Dissertation. University of Chicago, Illinois.

Moskovits, D. K. and Bjorndal, K. A. (1990). Diet and food preferences of the tortoises *Geochelone carbonaria* and *Geochelone denticulate* in northwestern Brazil. Herpetological

National Status

Many groups of researchers in India are working on the study of tortoise are as groups of researchers. Following content shows the national status of given study area like:

Andrews, H.V. and Whitaker, R. (1993). Captive breeding of freshwater turtles and tortoises at the Centre for Herpetology, Madras Crocodile Bank. Zoo's print journal.

Appukuttan, K.S. (1991). A survey report of cane turtle and Travancore tortoise. Kerala: Kerala Forest Department.

Auffenberg, W. (1964). Notes on the courtship of the land tortoise *Geochelone travancorica* (Boulenger). J. Bombay Natural History Society.

Agarwal, A. K. (1987). Observations on the sexual dimorphism in Indian freshwater tortoise *Lissemys punctata*.*Geobios.*

Buhlmann K.A., Akre T.S.B., Iverson J.B., and et al.(2009).A global analysis of tortoise and freshwater turtle distributions with identification of priorityconservation areas. Chelonian Conservation andBiology

Bhupathy S., (1997). Conservation of the endangered river terrapin *Batagurbaska* in the Sundarbans of West Bengal, India Journal of the Bombay natural history society.

Bhanita Deka and P. K. Saikia. (2015).DIVERSITY OF CHELONIAN SPECIES IN ORANG NATIONAL PARK,ASSAM, INDIA, Research Scholar, Animal Ecology and Wildlife Biology Laboratory, Department of Zoology, Guwahati University, Assam, India.

Van Dijk P.P., (2010). Status of the World's Tortoises and Freshwater Turtles, a summary overview.

Vasudevan, K., Pandav, B & Deepak, V. (2010). Ecology of two endemic turtles in the Western Ghats.Final Technical Report, Wildlife Institute of India.

Williams, E.E. (1952).A new fossil tortoise from Mona Island, West Indies, and a tentative arrangement of the tortoises of the world.Bulletin of the American Museum of Natural History

Significance of the study:

Significance has value or importance in current scenario. It shows applicability in new research and exploratiVeness in respective field. Following is the significance of given topic:

- Freshwater turtles have served as an important food resource in tropical and subtropical of many Asian countries. However, several countries of our region have made few attempts for conservation and management of the resource. In Asian countries, the shells and skin of freshwater turtles are little exploited for jewellery, tourist souvenirs, tourist trinkets, instruments, wall hangings and leather.
- They are mostly utilized to some extent as medicine and food. During our present study, it was also observed that Soft-shell turtles are targeted by local communities because parts of these turtles are in demand in the Chinese international markets and used in traditional Chinese medicines. **[M Zaheer Khan1, *Amtyaz Safi1, and et.al (2015)]**
- Tortoise also used for ceremonial purposes in Indian culture system.
- Tortoise has an ornamental value in our housesin regular life and put in aquarium. Aquarium species of tortoise are spotted turtle, yellow-bellied slider etc.
- To study of this topic, it gives consciousness about illogical beliefs (black magic, money rain etc) of human society for the tortoise.
- This study creates awareness related to conservation, why these animal in threatened condition, need of culturing, rearing and how to save of tortoise species in our environment.
- Increase public awareness to enhance public participation in conservation activities particularly directed towards freshwater tortoise turtles and their habitats.
- From these study people get motivation on the part of those knowing how and those willing to protect the species of tortoise.
- It gives a sight to humans to not disregard the laws of protection.
- Trafficking of tortoise is occurring and traffickers never get caught, either at national or international level.
- People keeping tortoises at home as pet are not made aware of the negative ecological impact that they are having. Then this area of study it will be change point of view of human beings related to care and conservation.

- Lack of knowledge surrounding the benefits of protecting the species; insufficient information and education
- Differing levels of knowledge among the institutions that are to make decisions on conservation, i.e. they are unaware of the current situation
- Not being aware of the laws; laws are also outdated and no longer effective
- Tortoise has an ecological importance in food chain and food web to maintain ecological cycle (calcium cycle). They also regulate energy flow of given environment. Tortoise is also called as ecosystem engineers due to their seed dispersal abilities, trampling of vegetation, and transport of nutrients.
- Freshwater turtles are known for their ecosystem services like keeping rivers, ponds and freshwater sources clean by eating algal blooms and scavenging on dead matter. "Freshwater turtles play an important role in being predators as well as the prey. They control invasive fishes by eating them, and at the same time, they are an important source of protein for a lot of animals that feed on turtle eggs and juvenile turtles," explains Dharwadkar. "They are scavengers, also sometimes known as "vultures of the aquatic ecosystem" keeping the ecosystem clean and an important part of the aquatic food chain. **[http://www.specieson the brink.org]**
- This study will be give clear understanding on the part of the local population of the ecological importance of tortoises.
- Tortoise need of care and conservation because now a day these species becomes threatened, vulnerable endangered.so this study will be very important.
- From this above study of tortoise/ turtle we will get knowledge about their identification, habitat, food and feeding behavior, nesting behavior, ecological study, sexual dimorphism, threats breeding and conservation.

VI. PROPOSED WORK PLAN / FORMULATION AND STRUCTURE OF STUDY:

The proposed work will consist of following chapters,

1. Introduction: For importance of the work, national and international status of the topic.

2. The chapter second will be devoted to review of literature of the work.

3. The chapter third will be related to materials and methods adopted in completion of the work.

4. The chapter fourth will contain sexual dimorphism.

5. The chapter fifth will contain morphological study, Habit, habitat, nesting behavior, identification keys.

6. The chapter sixth will contain threatened condition.

7. The chapter seventh will contain diversity, distribution, population, statistical data analysis

8. The chapter eight will contain induced breeding.

9. The chapter ninth will contain result, discussion, recommendation.

10. The tenth chapter will contain bibliography**.**

Year - wise plan of work and targets to be achieved:

Ist Year Work Plan:

- Attendance and completion of course work
- Preparation of course work exam
- Cleared / passed Course work exam
- Preparation of synopsis
- Extensive collection of review of literature of given topic
- Collection of data of given research topic
- Sample collection/ field visit/survey

- Collection of required instruments
- Morphological study of concentrated animal/topic

IInd Year Work Plan:

Work plan of second year shows as follows:

- Field visit/ survey/ selected study area
- Identification of animal
- Photograph of animal (Tortoise).
- Preparation of Research papers.
- Diversity and distribution
- Sexual Dimorphism
- Food and Feeding habits
- Nesting/ Parental care
- Breeding and egg laying

IIIrd Year Work Plan:

- Statistical Data Analysis
- Preparation of final synopsis
- Collection of research paper, preparation of final identification keys, construction of tables
- Typing , correction, collection of references

IV Th Year: Submission of Thesis

VII. REFERENCES:

References show the work that you used in your paper/ study, it indicate where you got the work or information from which is used in present topic/ study. It gives credit to that first author from which source of information used. It also helps in future research work as data form. Present topic references are given below:

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Helpful sites:

https://www.allturtles.com/turtle-identification/

Animal Planethttp://www.animal.discovery.com/reptiles/turtleinfo.htm

Animaldiversityhttp://www.animaldiversity.ummz.umich.edu/site/accounts/information/Testudines.html

Ministry of Environment and Forests, Government of India.<http://www.envfor.nic.in/legis/wildlife/wildlife1.html>

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